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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|---|---|---|---|---|
| 10/655,766 | 09/05/2003 | Jonathan Westphal | 80006 | 6894 |

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| EXAMINER | |
|---|---|
| SIEK, VUTHE | |

| ART UNIT | PAPER NUMBER |
|---|---|
| 2825 | |

DATE MAILED: 11/30/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

| Office Action Summary | Application No. | Applicant(s) | |
|---|---|---|---|
| | 10/655,766 | WESTPHAL, JONATHAN | |
| | Examiner | Art Unit | |
| | Vuthe Siek | 2825 | |

*-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --*

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

1)☒ Responsive to communication(s) filed on *12 September 2005*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

4)☒ Claim(s) *1-12* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-12* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

**Application Papers**

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

## DETAILED ACTION

1. This office action is in response to amendment filed on 9/12/2005. Claims 1-12 remain pending in the application.

### *Claim Rejections - 35 USC § 102*

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. Claims 1-12 are rejected under 35 U.S.C. 102(b) as being anticipated by Scholl et al., "BDD Minimization Using Symmetries," IEEE, Feb. 1999, pp. 81-100.

4. As to claims 1, 5, 8 and 11, Scholl et al. teach a method of designing logic circuits comprising representing multilevel logic schema in vector form (symmetric function can be represented in vector form); and for simplifying multilevel schema into a simplified form by exploiting symmetries (Fig. 3) in the logical schema (Boolean functions) (see page 81-3, section D page 84, paragraph III, starting page 84, paragraph IV, starting page 85). Scholl et al. teach detecting symmetries (partial) for both completely and incompletely specified Boolean functions before exploiting symmetries (page 82). Scholl et al. teach that logic function minimization comprises using symmetries by locating symmetrical variables side by side and receiving a modification of sifting: the symmetries sifting algorithm. The minimization would result minimizing the size of a logic function of the logic circuit design up to 70% (see abstract,

pages 81-82). Note that the Boolean functions are represented in vector form. The method must be operable on a computer system/computer network system having software stored thereon to execute the process. In order to produce a final product of logic circuit design, the logic circuit design must be synthesized and manufactured.

5. As to claims 2 and 7, School et al. teach simplifying multilevel logic schema comprising eliminating opposing couples. Scholl et al. teach detecting symmetries (partial) for both completely and incompletely specified Boolean functions before exploiting symmetries (page 82). Scholl et al. teach that logic function minimization comprises using symmetries by locating symmetrical variables side by side and receiving a modification of sifting: the symmetries sifting algorithm. The minimization would result minimizing the size of a logic function of the logic circuit design up to 70% (see abstract, pages 81-82).

6. As to claims 3, 9, 10 and 12 Scholl et al. teach a method of designing logic circuits comprising representing multilevel logic schema in vector form; and for simplifying multilevel schema into a simplified form by exploiting symmetries in the logical schema (see page 81-3, section D page 84, paragraph III, starting page 84, paragraph IV, starting page 85). Scholl et al. teach detecting symmetries (partial) for both completely and incompletely specified Boolean functions before exploiting symmetries (page 82). Scholl et al. teach that logic function minimization comprises using symmetries by locating symmetrical variables side by side and receiving a modification of sifting: the symmetries sifting algorithm. The minimization would result minimizing the size of a logic function of the logic circuit design up to 70% (see abstract,

pages 81-82). Note that the Boolean functions are represented in vector form. This would mean removing redundancy by eliminating opposing couples. In order to produce a final product of logic circuit design, the logic circuit design must be synthesized and manufactured.

7. As to claim 4, Scholl et al. teach detecting symmetries (partial) for both completely and incompletely specified Boolean functions before exploiting symmetries (page 82). Scholl et al. teach that logic function minimization comprises using symmetries by locating symmetrical variables side by side and receiving a modification of sifting: the symmetries sifting algorithm. The minimization would result minimizing the size of a logic function of the logic circuit design up to 70% (see abstract, pages 81-82). This would mean sliding symmetrical portions of the logic attached to opposing couples onto a point common to the opposing couples.

8. As to claim 6, Scholl et al. teach a method for designing logic circuits including minimizing logic functions (Boolean functions) by detecting symmetries (symmetric variables) and then exploiting the symmetries. The method must be executed on a computer system having software to communicate logical schema to one or more other computing devices inherently within the computer system.

***Remarks***

9. Applicant argued that Scholl et al. do not representing multilevel logic schema in vector form. Scholl et al. teach using information of partial symmetries for the minimization of reduced ordered binary decision diagrams (ROBDD's). The ROBDD represents totally symmetric functions that grows in each level at most by one node

(see Figure on page 85). Scholl et al. teach ROBDD (reduced ordered binary decision diagram), where the size of the representation is reduced by up to 70% (see abstract). Also Scholl et al. teach detecting partial symmetries for both completely and incompletely specified Boolean functions before exploiting symmetries (see page 82, left side). Scholl et al. teach that if we locate the symmetries of Boolean functions side by side and treat them a fixed block, we received a modification of sifting: the symmetric sifting algorithm, which shifts symmetric groups (portions of logic) simultaneously (see page 82, left side). The symmetric shifting algorithm would shift symmetric functions or moving or sliding symmetrical portions of the logic attached to opposing couples onto a point common to the opposing couples. This would clearly suggests that Scholl et al. teach eliminating opposing couples (side by side positions of Boolean functions), exploiting symmetries and sliding symmetrical portions of the logic (symmetric shifting algorithm). In addition, based on the present claims, Scholl et al. teach or suggest the claimed limitations. Applicant argued that Scholl et al. do not teach some limitations that are not recited in the claims. For example, Examiner found that the claims do not recite the multilevel logic is one which includes nested parentherical expressions, where the innermost parenthesis of nested parenthetical expressions are evaluated first before the next outermost set of parenthesis can be evaluated. Applicant argued that the vector form representation as taught by Scholl et al. is different from the one that applicant has in mind. Scholl et al. teach representing symmetric functions in vector form (see above). Thus the teaching meets the claimed limitation.

10. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Vuthe Siek whose telephone number is (571) 272-1906. The examiner can normally be reached on Increase Flextime.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Matthew Smith can be reached on (571) 272-1907. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Vuthe Siek

**VUTHE SIEK**
**PRIMARY EXAMINER**